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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,062	07/29/2003	Jyoti Mazumder	POM-13202/29	5850

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GIFFORD, KRASS, SPRINKLE,ANDERSON & CITKOWSKI, P.C
PO BOX 7021
TROY, MI 48007-7021

EXAMINER	
PADGETT, MARIANNE L	
ART UNIT	**PAPER NUMBER**
1762	

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06/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/629,062	MAZUMDER, JYOTI	
	Examiner	Art Unit	
	Marianne L. Padgett	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,9,12,13 and 15-20* is/are pending in the application.

4a) Of the above claim(s) *12,13 and 15-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 9, 14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. This application contains claims 12-13 & 15-19 drawn to an invention nonelected with traverse in the reply filed on 5/9/2006. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

2. All the 112 problems discussed in section 2 of the action mailed 10/10/2006 have been explicitly corrected, except in claims 2-5, "improved" remains a relative term, however the amendments to claim 1, which specify particular material for the body (Al or an alloy thereof) & application of specific material on the surface (Mo alloy), in combination with applicant's comments in the remarks 4/10/2007 at the top of page 5, are considered to show that the use of "improve" is now sufficiently defined.

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly

owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-5, 7 & 9 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3 of copending US Patent No. 7,139,633 (previously SN 10/652,260), in view of Koch et al. (6,122,564).

The present claims have been amended to include the limitations of claims 8 (Al body) & 11 (working surface = metallurgically bonded Mo alloy), but as these limitations were already encompassed in the rejection, being explicitly in the independent claim 1 of the patent (633), the amendment does not change the substance of the rejection.

The present application claims have overlapping scope with that of copending patent (633), where the present claims are considerably broader, thus may be considered to encompass the specific steps of (633), considering that the optical monitoring step used with the closed-loop DMD, is consistent with the presently claimed "CAD data" (if it means computer acquired data or computer aided design), as use of such real-time dimensional monitoring & control must use computers to be precise, or it would have been obvious to one of ordinary skill to employ such a CAD system to make the claimed optical monitoring useful. Note that the coating of the aluminum substrate (die or tool) with molybdenum, will inherently produce improved life of the tools depending on the environment in which they are employed, thus reading on the claimed improved where, oxidation resistance & dissolution limitations.

Alternately, Koch et al. teach optical monitoring with a CAD system in a laser cladding process environment (abstract; col. 2, lines 10-35), hence demonstrating the obviousness of the above arguments. Furthermore, Koch et al. notes that the dies, such as are treated in claims of (260), have cooling channels

in their bodies (col. 1, lines 14-24), hence would have been a matter of conventional practice for the die bodies treated to have such channels, as they would have been obvious for their conventional usage in such tools/devices.

5. The obviousness double patenting rejections with respect to U.S. Patent No. 6,472,029 B1 (Skszek), in view of Koch et al. (6,122,564), plus copending Applications No. 10/116,197 (also see 2002/0165634 A1) & 10/999,730 (also see 2005/0121112 A1) have been overcome as the claims rejected therein did not encompass the material is now required in the independent claim. Note for the applications, which are still pending, that the latest amendment in (197) also has not added the limitations as now required in the present independent claim, while (730) has not been amended.

6. The rejections 102(b) or (e) as being anticipated by Koch et al. (6,122,564), or Weisse et al. (5,189,781), or Skszek ((6,472,029 B1) or (2002/0165634 A1 = SN 10/116,197)), or Mazumber et al. (2002/0142107 & 2005/0121112), have been removed by the amendment of independent claim 1 to include the limitations of claims 8 & 11.

7. Claims 1-6 & 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skszek ((029) or (634 A1)), or Mazumber et al. ((107) or (112)), in view of Hirakawa (4,505,485).

Claims 1-6 & 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koch et al., optionally in view of Jeantette et al., or over Lewis et al. optionally a view of Koch et al. or Jeantette et al., and further in view of Hirakawa (4,505,485).

The broad language of independent claim 1 is noted to have "a mold, die or tool having a working surface", where it is further noted that any "tool" encompasses any object that can be used to do something & that any surface on it that has any function can be said to be a "working surface". Therefore,

while Koch et al. is directed to fabricating complete articles as a whole, not just modifying their surfaces, the present claims modify the surface or body; hence the substrate used in Koch et al. as a base on which to create an article is a "tool", where the fabrication surface is its "working surface" (abstract; figures 1-3; col. 1, lines 5-10 & 64-col. 2, line 50; col. 3, lines 30-68+, etc.). Hence, Koch et al. modify the body (substrate) and it's working surface via a laser cladding DMD process as claimed, which is CAD controlled, thus reading on the independent claim. The process is suggested for molds & dies, including those with cooling channels (col. 1, lines 13-24).

The teachings of Koch et al. in the example on col. 8, provide teachings of depositing a Cr-Mo steel alloy, and since this metal is thermally conductive, any addition of it can act as a heatsink, hence such additions can be considered consider to incorporate it in to the "wrought H13" alloy substrate, and to relevant claims 6, noting a laser cladding of a Mo-containing alloy material. However Koch et al. defers by not teaching the presently claimed combination of aluminum body, with a metallurgically bonded Mo coating.

Optionally, Koch et al. (564) is further considered, in view of Jeantette et al. (6,046,426), with respect to the option of providing a mold, die or tool as a substrate, then using the claimed CAD & DMD process to modify the surface, is not taught by Koch et al. *per se*, however the background of Jeantette et al. indicates that one of laser cladding's well known & established uses is for hardfacing and improving corrosion resistance of a substrate, or to improve wear properties, corrosion resistance, thermal barrier coatings, etc., via laser cladding of similar or dissimilar materials, hence it would have been obvious to one of ordinary skill to incorporate in the laser cladding DMD/CAD process of Koch et al., a laser cladding step for providing improved surface characteristics as claimed, as such would have enabled both properties & surface properties to be optimized separately for effects indicated by Jeantette et al., which were generally known to be advantageous for molds, dies, tools, etc. as produced by Koch et al. incorporated into the "wrought H13" alloy substrate.

In Skszek (PN 642029 B1), see abstract; figure 1; summary; col. 3, lines 5-61; col. 4, especially line 7-15, 30-39 & 60-col. 5, line 14 for teachings of DMD laser based process using CAD/CAM control, where mold and die is maybe found taught with alternating layers deposited of different materials (examples of two or three), where the materials provide different properties, such as thermal barrier (steel), or thermal conductivity (Cu), or bond coating (Ni). The process can incorporate cooling channels into the product (col. 5, lines 15-54+ & claims 10-13). Note that for the last layer made, it has been deposited on a provided (by the fabrication) mold or die substrate, and it provides its characteristic to improve the overall product, with teachings including abrasion resistance & strength. Also the stronger interface due to the use of bond coats are said to provide a metallurgical bond that avoids delamination and cracking, where the examiner notes that such protection will also provide the overall mold or die product with protection against oxidation, since if such defects occurred, they would provide ingress for oxidation into the body of the mold. The claims of Skszek (029) were also noted to be relevant to the claim limitations when directed to generic metal materials, and overall the teachings of Skszek (029) differ from the claims as amended by not be directed to coating and aluminum body with a molybdenum alloy.

It was noted that while the present case and Skszek (029) have different inventors, J. Mazumder & T. Skszek are seen to be coinventors in copending applications, such as 10/999,730 (2005/0121112 A1), and no assignment information is available on the present application, hence this rejection is being made due to the potential/probability of the assignments being the same.

In Skszek (2002/0165634 A1 = SN 10/116,197), see the claims 1-27, plus paragraphs [0029-30] & [0032] for aluminum or aluminum-silicon substrates. In the claims there are overlapping ranges of limitations, where the claims are presented in different orders, thus creating variations on the

same theme, where the present claims are broader in that their substrate made by any means, which is a mold, die or tool, thus encompass the narrower claims of Skszek, which specify how the substrate is provided via a lamination process, but the present claims have been amended to differ from Skszek (634) in requiring specific materials of an aluminum body & molybdenum coating.

In Mazumber et al. (2002/0142107 & 2005/0121112), the East references are noted to have overlapping inventors, but different inventive entities, with the earlier effective filing dates, and no assignment available for the present case, hence until shown that it was commonly on at the time at the invention, it is prior art. In the publications, see claims 1-2 for the claim techniques, characteristics of surface deposits and structures such as cooling channels & heat sinks. Also see example 3, paragraph [0048] for aluminum or aluminum-silicon substrates. While the Mazumber et al. references have claimed Al or Al-Si substrates, they differ by not having the molybdenum coating.

Lewis et al. (5,837,960). teach a laser deposition process that uses powders (exemplary metal powders of steel, aluminum, etc.) to fabricate articles (tools, molds, dies), employing CAM & CAD computer controls, where they additionally teach that articles may have graded compositions using two different materials, so as to for example in a turbine to produce an article with a rim made of different material that has high temperature and abrasion resistant properties compared to the interior, with the overall having improved strength. It is noted that turbine high temperature conditions would be inclusive of the relative the claimed oxidation resistance & thermal barriers. Lewis et al. further teach that their process is "well-suited to coating articles" (col. 20, lines 55-68) were coating of tools such as blades are mentioned, as well as alloying by codepositing materials or forming layered structures. In Lewis et al. see the abstract; figure 1; col. 1, lines 13-25 & 37-41; col. 2, lines 40-56; summary, especially col. 3, lines 25-43 & 65-68, plus col. 4, lines 8-10 & 15-30; col. 5, lines 52-67+; col. 6, lines 29-59; examples 1-3 on

cols. 10-12 for formation of articles with stainless steel powder, tungsten powder or nickel aluminide powder respectively; col. 15, lines 35-col. 16, line 60 for CAD, laser deposition & CAM techniques; col. 17, lines 20-25 & 50-65, plus col. 20, lines 1-19 for processing using stainless steel or aluminum powders; col. 18, lines 29-35 for production of internal cavities or drain holes, etc., in articles; col. 21, lines 39-col. 22, line 8 for various grading & coating techniques; col. 24, lines 29-45+ for joining dissimilar metals; and col. 25, line 41-col. 26, 111 for more techniques on grading. As amended at the present claims differ by requiring an aluminum body, with a metallurgical molybdenum coating.

While Lewis et al. does not specifically mention cooling channels per se, they teach that their articles may incorporate cavities in drainage holes, etc., which broadly encompasses cooling channels, hence since it is old and well-known to provide cooling channels in any tool, die or mold which may be subjected to high heating during its use, so as to prevent thermal damage & extend the articles useful lifetime, it would've been obvious to one of ordinary skill in the art to employ this teaching to provide conventional features to taught molds, dies, or tools. Alternatively, Koch et al. (col. 1, lines 13-24) as discussed above provides the motivation for cooling channels asserted as obvious above

It is further noted that while suggesting articles made of aluminum & aluminum alloys, and suggesting coating the claimed process techniques, Lewis et al. do not specifically suggest coating aluminum articles via their taught technique, however it would've been obvious to one of ordinary skill in the art to apply the taught coating technique to such metal/aluminum articles formed by the laser deposition technique, especially considering that on col. 21 lines 14-22 Lewis et al. teach that such articles generally have relatively rough surface is that need further treatment, with the succeeding coating & grading teachings generically suggesting providing improved surface properties via coating, where the article already needs treatment that is by laser, especially considering that aluminum is old and well-known as a relatively soft material.

It was noted that Jeantette et al. discussed above in combination with Koch et al., also provides cumulative evidence applicable to Lewis et al. for the expected properties of a laser cladding coatings on articles.

While none of the above various primary references or combinations of references teach the specific combination of molybdenum alloy bonded to aluminum, however Hirakawa teach a hardening treatment for a rotating shaft (tool) to create a rotary seal via a re-melting technique, which may use a **laser beam** and a **deposited alloying layer that is bonded** to the base metal substrate **via laser treatment**. Applicable base metal materials include various steels or **aluminum (alloys) or Al-Si alloy**, where the **wear-proof layer may be Cr-Mo or Mo-Ni-Cr or include molybdenum mixed** with a carbide or C. In Hirakawa, see the abstract col. 1, lines 5-10 & 64-col. 2, line 7 & 58-67+; and col. 4, line 24-col. 5, line 6, especially noting col. for lines 29-37 & 66-col. 5 line 2. Therefore, it would have been obvious to anyone of ordinary skill in the art, given the generic teachings of the primary references/combinations concerning laser cladding on metal substrates, with or without specific teachings of aluminum substrates, to use metal surface coating techniques as taught by the primary references/combinations for the specific product of Hirakawa, as it shows the desirability of using this specific material combination, as well as teaching its formation via a laser technique process, which is suggestive of or compatible with the more specific laser deposition techniques of the primary references/combinations, where the primary references/combinations provide motivation for using their technique due to its superior controllability, etc. as disclosed therein. The primary references to Mazumber et al. ((017) or (112)), recharged specifically directed to claimed substrate/body provide additional motivation, however the generic technique itself has already been shown to be advantageous for cladding metal surfaces on metal different bodies, where Hirakwa provides a reasonable expectation to one of ordinary skill of the aluminum body plus Mo coating of be effectively & advantageously applied

by the techniques of the primary references or primary references with their optional secondary references.

8. Previously cited art of interest for relevant laser cladding techniques included through (7009137 B2) & Becker et al. (2006/0060573 A1), however they are not prior art.

9. Applicant's arguments filed 4/10/2007 & discussed above have been fully considered but they are not persuasive.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained

from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MLP/dictation software

6/24/2007

MARIANNE PADGETT
PRIMARY EXAMINER